

**Historical and current records of *Scolia hirta* SCHRANK, 1781
(Hymenoptera: Scoliidae) in Poland**

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ABSTRACT. *Scolia hirta* SCHRANK, 1781 was reported in Poland with variable frequency during the last 100 years. An analysis of its present distribution indicates that since the year 2000, its population size tends to increase. As many as 26 new records of *S. hirta* have been reported since then, mostly at edges of river valleys.

KEY WORDS: Hymenoptera, Aculeata, Scoliidae, *Scolia hirta*, faunistic records, Poland

INTRODUCTION

Scolia hirta SCHRANK, 1781 is a large stinging wasp, characterized by a black body with two bright yellow, wide bands on the abdomen, and black-brown wings with blue lustre (Fig. 1).

This species is widespread in the Palaearctic, associated mostly with steppe and forest steppe. Its distribution range includes in the west and north: France, Germany, and Poland. In the European part of the former Soviet Union, it reaches in the north to Kursk, Voronezh and Kuybyshev, and in the east to Transbaikalia. It is also found in Kazakhstan, central Asia, Turkey, Iran, and North Africa (STEINBERG 1962).

This species is listed in the Polish Red Data Book of Animals (category VU), and its existence is threatened not only in our country, but also generally in Europe (BANASZAK

2004). Although rare, it has not been included in the Polish list of protected species yet. During the last 100 years, it was reported in Poland with variable frequency.

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Biology and habitat preferences

Larvae of *S. hirta*, like those of all other scoliid wasps, develop within soil larvae of scarab beetles (*Cetonia*, *Potosia*, *Epicometis*, and *Anomala*). A female wasp digs down to them with its forelegs, covered with numerous spines. When it finds a grub (usually of the rose chafer *Cetonia aurata* or cockchafer *Melolontha* sp.), it stings it into paralysis, and next lays an egg in its body. The hatched larva of *S. hirta* feeds on the paralysed beetle larva for 5-8 days, and next spins a cocoon (22 mm long and 8 mm across), where it pupates (PULAWSKI 1963).

As a thermophilous species, *S. hirta* prefers sandy, sunny sites. It usually caught on wild thyme (*Thymus serpyllum*), spiked speedwell (*Veronica spicata*), flat sea-holly (*Eryngium planum*), sheep's bit (*Jasione montana*), or field scabious (*Knautia arvensis*) (BANASZAK 2004). Most of the plant species have blue flowers, which are preferred by *S. hirta*. It is also found in warm habitats, covered with sparse vegetation, e.g. in forest clearings.

The species is usually collected in areas adjacent to pine forests, rather than in completely open habitats. It seems that favourable sites for *S. hirta* are the habitats where – in addition to host plants – there is some rotten wood of trees and shrubs, as well as anthills, where scarab larvae can develop. This can be confirmed by long-term faunistic research conducted by BANASZAK (unpubl. data) on two sites located close to each other, covered with thermophilous vegetation in the Wielkopolska-Kujawy Lowland. On the first site, in Folusz near Szubin, with a large contribution of pine trees (*Pinus sylvestris* L.), *S. hirta* was quite frequent (BANASZAK et al. 2004). In contrast, in the nearby locality of Małe Rudy, which is also a sandy 'island' surrounded by fields and meadows, but with a small contribution of pine trees, the species was never recorded.

Changes in fauna: historical and current records of *S. hirta* in Poland

To analyse the dynamics of distribution of this species in our country, we present here the historical and current records of this species in four consecutive periods: before 1950, in 1951-1975, in 1976-2000, and after the year 2000.

An analysis of published data indicates that this species was recorded relatively frequently before the year 1950. At that time, researchers reported about 18 records of *S. hirta* in the Baltic Coast District (CZUBIŃSKI & URBĄŃSKI 1951), Wielkopolska-Kujawy Lowland (MEYER 1919, SZULCZEWSKI 1927, 1930, 1950, BETREM 1935, GOEBEL 1937,

WODZICZKO 1938), and in Lower Silesia, including Trzebnica Hills and the Eastern Sudetes (DITTRICH 1911, WIŚNIEWSKI 1994, BANASZAK 2004) (Table 1) (Fig. 2).



Fig. 1. *Scolia hirta* SCHRANK, 1781

In 1951-1975, this species was recorded on only four sites, in the Masovian Lowland (GŁOWACKI 1953, PUŁAWSKI 1963), Upper Silesia (MACKO & NOSKIEWICZ 1959), and the Wolin National Park (RAFALSKI & URBĄŃSKI 1973). Besides, the collection of the Museum and Institute of Zoology of the Polish Academy of Sciences in Warsaw, includes a specimen of *S. hirta*, collected in 1954 by WRÓBLEWSKI in Chotomów near Warsaw. In the published literature there are also some data on occurrence of *S. hirta* in Włoszakowice in August 1960 (Z. PNIEWSKI, oral comm.), in the reserve of xerothermic vegetation 'Biała Góra' near Elbląg in 1972 and 1975, and in Starogród near Toruń in 1971 (BANASZAK 1978). Thus we assumed that in the second study period, i.e. in 1950-1975, *S. hirta* was observed in 8 localities (BANASZAK 2004) (Table 1) (Fig. 2).

In the following study period, i.e. in 1976-2000, *S. hirta* was recorded in 6 localities, in Masurian Lakeland (KOWALCZYK 1988a, 1988b), Podlasie (KOWALCZYK 1988b), and the Wielkopolska-Kujawy Lowland (WÓJTOWSKI et al. 1980). Two unpublished records need to be mentioned here: in Lasotki on the river Wkra in the Brudzieński Landscape Park (by J. KOWALCZYK in 1997) and in the Łęczyn village near Dobiegniew in Pomeranian Lakeland (by W. MAJAK in 1999) (Table 1) (Fig. 2).

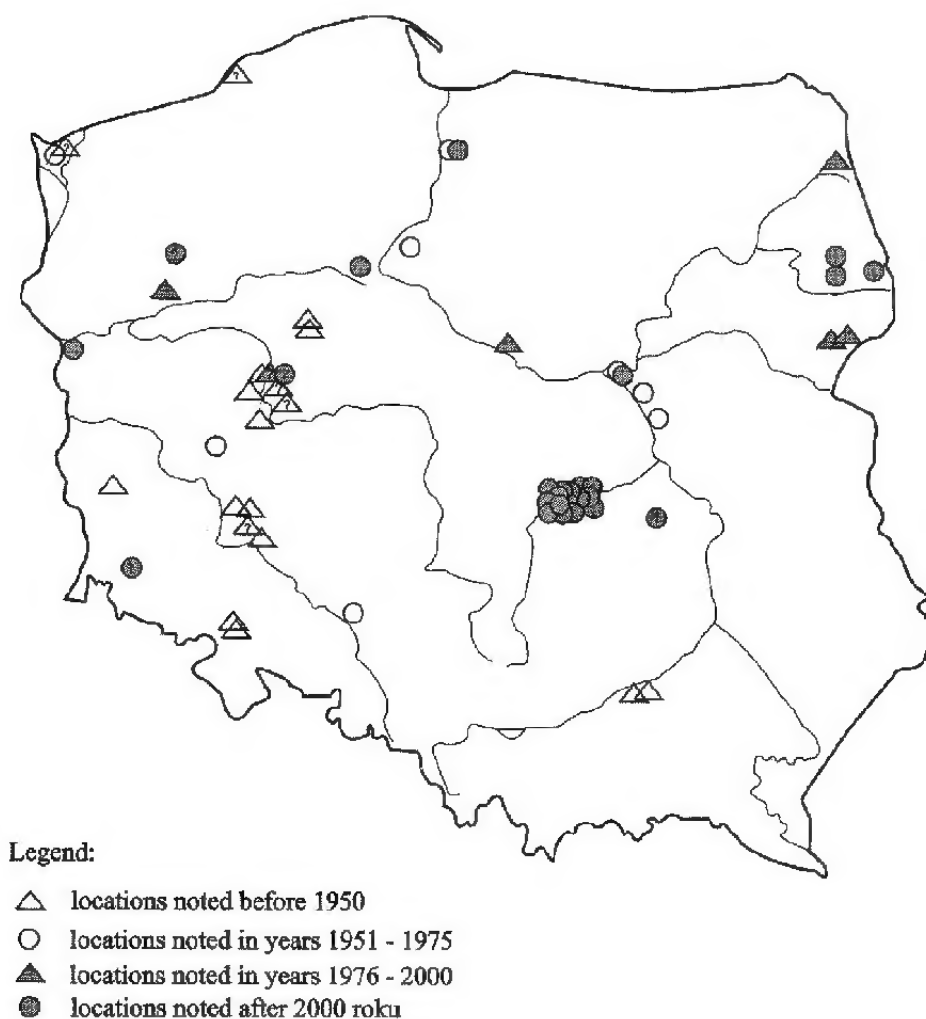


Fig. 2. Map of distribution *Scolia hirta* in Poland.

In the last few years in Poland, the species was recorded in as many as 26 localities, including some in the Wielkopolska-Kujawy Lowland (BANASZAK et al. 2004), Masovian Lowland (TABOR & CIACH 2006), and unpublished records from Podlasie (by J. TWERD and L. TWERD in 2001 and 2008), the Drawa National Park (by T. CIERZNIAK in 2003), reserves of xerothermic vegetation: 'Pamięcin' in NW Poland (by R. KRIGER in 2005) and

'Biała Góra' in central Poland, on steep slopes of the Vistula valley near Sztum (by J.K. KOWALCZYK in 2000), on foothills of the Kaczawskie Mts. (by J. SOBOŃ in 2008), in Smogulec (by A. KONOPKA in 2008), in Warsaw, reserve 'Skarpa Ursynowska' (by T. JAWORSKI in 2007), and in Kozienice Forest (by M. MIŁKOWSKI in 2008) (Table 1, Fig. 2).

Table 1. List of records of *Scolia hirta* in Poland.

Location	Date	UTM	Habitat	Source
-1-	-2-	-3-	-4-	-5-
Krzaków	1911 1939	-	-	R. DITTRICH (1911) B. WIŚNIEWSKI (1994)
Lasów	1911	-	-	R. DITTRICH (1911)
Oborniki Śląskie	1911	-	-	R. DITTRICH (1911)
Orzeszków	1911	-	-	R. DITTRICH (1911)
Ślup	1911	WS76	-	R. DITTRICH (1911)
Tumidaj	1919 1927	XU45	-	O. MEYER (1919) J.W. SZULCZEWSKI (1927)
Wągrowiec	1927 1930	-	-	J.W. SZULCZEWSKI (1927) J.W. SZULCZEWSKI (1930)
Ludwikowo	1937	XT37	-	F. GOEBEL 1937
Kobyłepole	1937 1950	-	-	F. GOEBEL 1937, J.W. SZULCZEWSKI 1950
Dzierżoniów	1939	-	-	B. WIŚNIEWSKI (1994)
Lubasz Szucin (on river Vistula)	1949	EA07	-	W. NIESIOŁOWSKI (1949)
Pozegowo	1950	-	on <i>Thymus serpyllum</i> and <i>Jasione montana</i>	J.W. SZULCZEWSKI (1950)
Lower Silesia	1911- 1912 1933	-	-	E.J.R. SCHOLZ (1911-1912) J.G. BETREM (1933)
Pomeranian Lakeland	1921	-	-	G. SCHRÖDER (1921)
Wielkopolska- Kujawy Lowland	1935	-	-	J.G. BETREM (1935)
Wielkopolska National Park	1938 1950	-	-	A. WODZICZKO et al. (1938) J.W. SZULCZEWSKI (1950)
Wolin National Park	1950	-	-	Z. CZUBIŃSKI & J. URBAŃSKI (1951)
Miłosna near Warsaw	1953	-	-	J. GŁOWACKI (1953)
Chotomowo near Warsaw	1954	-	-	leg. WRÓBLEWSKI
Włoszakowice	1960	-	on <i>Thymus serpyllum</i>	Z. PNIEWSKI (oral comm.)
Starogród	1971	-	steep slope of Vistula valley, with southern exposure	J. BANASZAK (1978)

-1-	-2-	-3-	-4-	-5-
Biała Góra near Elbląg	1972 1975	-	reserve of xerothermic vegetation	J. BANASZAK (1978)
Upper Silesia (Górny Śląsk), along rivers Strobawa and Mała Panew	1959	-	-	S. MACKO & J. NOSKIEWICZ (1959)
Masovian Lowland (Nizina Mazowiecka)	1963	-	-	W. PULAWSKI (1963)
Wolin National Park	1973	-	-	J. RAFALSKI & J. URBAŃSKI (1973)
Rubkowo	1977	-	cleared patch in a forest, wasteland	KOWALCZYK (1988b)
Kloszczele	1986	-	cleared patch in a forest, wasteland	J.K. KOWALCZYK (1988a)
Witowo	1986	-	cleared patch in a forest, wasteland	J.K. KOWALCZYK (1988a)
Lasotki	1997	-	-	J. BANASZAK et al. (2004)
Łęczyn	1999	-	-	J. BANASZAK et al. (2004)
Onion fields near Poznań	1980	-	-	F. WÓJCIOWSKI et al. (1980)
Folusz near Szubin	2001 2002	-	xerothermic vegetation (on <i>Veronica spicata</i>)	J. BANASZAK et al. (2004)
Dębowa Góra near Stanisławów	2001 2002- 2003	DC61	dry, sunny, postglacial esker (on <i>Thymus</i> sp.)	J. TABOR & M. CIACH (2006)
Biała Góra near Elbląg	2000	-	reserve of xerothermic vegetation	J.K. KOWALCZYK (oral comm.)
Grzybowce	2001	FD88	cleared patch in a forest, wasteland	unpubl. data J. TWARD
Ogrodniczki	2001	FD59	partly overgrown gravel pit (on <i>Thymus serpyllum</i>)	unpubl. data J. TWARD
Brudzewice-Jaźwiny	2002	DC50	sandy grassland, with numerous junipers	J. TABOR & M. CIACH (2006)
Królówka near Stanisławów	2002- 2003	DC61	dry, sunny, postglacial esker (on <i>Thymus</i> sp.)	J. TABOR & M. CIACH (2006)
Stanisławów	2002- 2003	DC61	dry, sunny, postglacial esker (on <i>Thymus</i> sp.)	J. TABOR & M. CIACH (2006)
Drawa National Park 'Pamięcin' near Owczary	2003	-	-	unpubl. data T. CIERZNIK
Odrzywół	2005	VL71	reserve of xerothermic vegetation	unpubl. data R. KRIGER
	2005	DC70	sunny sand pit (on <i>Thymus</i> sp.)	J. TABOR & M. CIACH (2006)
Inowłódz	2006	DC40	sandy grassland, with <i>Corynephorus canescens</i> and <i>Thymus</i> sp.	J. TABOR & M. CIACH (2006)

-1-	-2-	-3-	-4-	-5-
Tcofilów	2006	DC40	sandy bank of river Pilica, with a sand pit (on <i>Veronica longifolia</i>)	J. TABOR & M. CIACH (2006)
Antoniów	2006	DC40	riparian tall-herb communities and forest edge (on umbellifers)	J. TABOR & M. CIACH (2006)
Królowa Wola	2006	DC41	small vegetable garden, adjacent to patchy farmland (on <i>Origanum vulgare</i>)	J. TABOR & M. CIACH (2006)
Królowa Wola - Kolonijka	2006	DC41	tall-herb communities, near a partly overgrown pond (on <i>Carduus crispus</i>)	J. TABOR & M. CIACH (2006)
Błota Brudzewickie, south part	2006	DC61	tall-herb communities (on <i>Carduus crispus</i>)	J. TABOR & M. CIACH (2006)
Błota Brudzewickie, north part	2006	DC61	tall-herb communities (on <i>Carduus crispus</i>)	J. TABOR & M. CIACH (2006)
Ceterń	2006	DC50	roadside tall-herb communities (on <i>Carduus crispus</i>)	J. TABOR & M. CIACH (2006)
Zakościele	2006	DC40	tall-herb communities, at edge of Pilica valley, near fresh coniferous forest (on <i>Carduus crispus</i>)	J. TABOR & M. CIACH (2006)
Gapinin	2006	DC51	dead individual, in a sticky spider web of <i>Argiope bruennichi</i> , located on edge of Pilica valley	J. TABOR & M. CIACH (2006)
Warsaw, reserve 'Skarpa Ursynowska'	2007	-	-	T. JAWORSKI (oral comm.)
Bobrowa	2008	FD58	cleared patch in a forest, wasteland	unpubl. data L. TWERD
Smogulec	2008	-	-	A. KONOPKA (oral comm.)
foothills of Kaczawskie Mts.	2008	-	-	J. SOBOŃ (oral comm.)
Kozienice Forest	2008	-	-	M. MIŁKOWSKI (oral comm.)

Threats and possibilities of protection

The species is not protected by law in Poland. Currently it is recorded in steppe reserves (Folusz, Pamięcin, Biała Góra), in the Drawa National Park, and in the Knyszyn Forest Landscape Park (Fig. 3).



Fig. 3. Habitat of *Scolia hirta* in a forest clearing near the Bobrowa village, in the Knyszyn Forest Landscape Park.

An analysis of distribution of *S. hirta* indicates that the species was reported in Poland with variable frequency. It is difficult to identify the causes of this phenomenon.

It seems interesting that currently, in spite of the gradual disappearance of xerothermic habitats, *S. hirta* is found on relatively numerous xerothermic sites, located in various parts of the country. Its numerous records in recent years may be associated with favourable weather conditions, i.e. warm and dry growing season.

Presumably, the high abundance of scarab larvae observed every 3-4 years, can also result in a higher frequency of this characteristic wasp.

Sites of *S. hirta*, which are also inhabited by other thermophilous species, are threatened by natural succession and require active protection. It seems that a great chance for survival of this species may be offered not only by the areas covered by xerothermic vegetation, but also by extensive wastelands, clearings or openings in forests (Fig. 3).

Conclusions

The analysis of distribution of *S. hirta* indicates that since the year 2000 its population size tends to increase. This is confirmed by the growing number of records of *S. hirta*, mostly at the edges of river valleys.

Unfortunately, for some of the records, particularly the historical ones, the detailed location on the UTM grid was not given, because in the past this grid was rarely used in Poland. Hence information about location of the site can be only inferred from descriptive data included in the literature. Precise localization is particularly troublesome for very small or large localities. In the first case, it is difficult to find the locality on maps that are easily available in Poland, i.e. on a scale of 1: 250 000. In the second case, the problem is that a large locality may include several UTM squares. Besides, some authors do not provide any information on the site of collection, and describe only the geographic region or part of the country where research was carried out and *S. hirta* was recorded. Those records were also included in the database on the distribution of this species in Poland, but their location has not been specified with the use of the UTM grid. On the map (Fig. 2), the localities were denoted by question marks.

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